

What is claimed is:

- 1           1.    A pump used in connection with a container filled with a liquid, the pump  
2                comprising:  
3                a)    a pump body defining an air chamber and a liquid chamber separated  
4                      by a seal;  
5                b)    a cup slidably received within said pump body at said liquid chamber,  
6                      said cup being in selective communication with the liquid, whereby  
7                      said cup is filled with liquid when the pump is in an idle position;  
8                c)    a head assembly slidably mounted within said pump body and  
9                      sealingly engaging said air chamber;  
10              d)    a plunger extending from said head assembly through said seal and  
11                     into said cup and slidably received therein; and  
12              e)    a mixing chamber in selective fluid communication with said liquid  
13                     chamber and said air chamber, said mixing chamber opening  
14                     externally of said head assembly, whereby operation of the pump  
15                     causes liquid from the liquid chamber and air from the air chamber to  
16                     mix in the mixing chamber to form a foam which is discharged from  
17                     the head assembly;  
18              f)    wherein said cup is spaced from an end of said pump body by a first  
19                     spring adapted to urge said cup toward said plunger;  
20              g)    wherein said plunger is adapted to bottom out in said cup to empty said  
21                     liquid chamber; wherein said air chamber is sized to allow further  
22                     inward movement of said head assembly after said plunger bottoms  
23                     out, whereby said further inward movement of said head assembly  
24                     compresses said spring and forces a blowing charge from said air  
25                     chamber through said mixing chamber and said head assembly to  
26                     evacuate any foam remaining therein.
- 1           2.    The pump of Claim 1, wherein said cup has a base, said base being spaced  
2                from said end of said pump body and wherein said spring is located between  
3                said end and said base.

- 1           3.    The pump of Claim 1, wherein said cup includes a valve adapted to  
2               selectively allow liquid from the container to fill said liquid chamber.
- 1           4.    The pump of Claim 3, wherein said cup includes a base defining an opening  
2               in communication with the liquid; wherein said valve is seated in said base  
3               and axially slidable relative thereto, said valve including a stem portion and  
4               a head portion extending radially outward thereto to cover said opening.
- 1           5.    The pump of Claim 4, wherein said head portion of said valve includes a  
2               flexible flange adapted to flex outwardly from said base in said cup when a  
3               negative pressure is formed within said cup by said plunger.
- 1           6.    The pump of Claim 1, wherein said plunger includes a hollow shaft  
2               extending outwardly from said mixing chamber and a sleeve mounted on  
3               said shaft, wherein said sleeve slidably engages an inner surface of said cup,  
4               wherein said shaft defines a port opening outward from said bore; wherein  
5               said sleeve is positioned over said port and slidable on said shaft to expose  
6               said port to said fluid as said plunger is driven into said liquid chamber,  
7               whereby liquid from said liquid chamber travels through said port and said  
8               bore toward said mixing chamber.
- 1           7.    The pump of Claim 1 further comprising a screen mounted downstream of  
2               said mixing chamber whereby the foam exiting said mixing chamber passes  
3               through said screen.
- 1           8.    The pump of Claim 1, wherein selective fluid communication between the  
2               air chamber and the mixing chamber is controlled by a first valve and a  
3               second valve, said first valve being in communication with said air chamber  
4               and a vent opening externally of the pump, said second valve being in fluid  
5               communication with said air chamber and said mixing chamber, wherein  
6               said first and second valves are flexible, wherein inward movement of said  
7               head assembly pressurizes said air chamber flexing said first valve to a  
8               closed position and said second valve to an open position allowing air from

1           said air chamber to be directed to said mixing chamber and whereby a  
2           negative pressure within said air chamber causes said first valve to flex open  
3           allowing air from outside of the pump to enter said air chamber.

1           9.    The pump of Claim 1 further comprising a second spring operatively  
2           engaging said pump body and said head assembly, whereby said second  
3           spring urges said head assembly outward from said pump body.

1           10.   The pump of Claim 9, wherein said first spring has a greater compression  
2           strength than said second spring.

1           11.   A pump comprising: a pump body having a head assembly slidably received  
2           therein; a mixing chamber in communication with an air source and a liquid  
3           source; wherein said head assembly is movable relative to said pump body  
4           to define a pump stroke, wherein said head assembly urges air from said air  
5           supply and liquid from said liquid supply into said mixing chamber to form  
6           a foam during said pump stroke; wherein said mixing chamber opens  
7           externally of said pump body and wherein during a portion of said stroke  
8           less than a complete stroke, said mixing chamber receives fluid and air to  
9           form a foam and discharge said foam externally of the pump and wherein  
10          during the remainder of said stroke, a blowing charge from said air source is  
11          urged through said mixing chamber and externally of the pump to evacuate  
12          any residual foam in the pump.

1           12.   A method of dispensing foam comprising: in a single stroke, pumping foam  
2           during a first portion of said stroke and pumping air during the remainder of  
3           said stroke.

1           13.   The method of Claim 12 further comprising the step of mixing liquid and air  
2           to form the foam during said first portion of said stroke.

1           14.   A dispenser comprising: a container having a pump mounted thereon;  
2           wherein said container is filled with a liquid;

1                wherein said pump includes a pump body defining an air  
2 chamber and a liquid chamber and a head assembly movable relative to  
3 the pump body and adapted to mix air from said air chamber and liquid  
4 from said liquid chamber to form a foam that is discharged during a  
5 portion of a single pump stroke;

6                wherein said liquid chamber is in selective fluid communication  
7 with said container; wherein said liquid chamber has a height less than  
8 that of said air chamber such that said head assembly evacuates said  
9 liquid chamber prior to evacuating all of the air in said air chamber,  
10 whereby completion of the pump stroke pumps the remaining air from  
11 the air chamber without mixing that air with the liquid, whereby any  
12 foam residue is urged outwardly by the air.